

## IN THE SPECIFICATION

Please replace the paragraph at page 2, lines 3-13, with the following rewritten paragraph:

An example of the SDM method is explained briefly (see ~~Non-Patent Literature 1~~ “Proposal for SDM-COFDM for Wide Band Mobile Communication Realizing 100 Mbit/s by MIMO Channels”, Technical Report RCS2001-135 of The Institute of Electronics, Information and Communication Engineers). In a communication apparatus at a transmitter side, error correction coding is carried out individually on data of two channels that are transmitted simultaneously, and thereafter, a predetermined modulation processing is carried out on the respective data after coding, and the results thereof are placed at corresponding subcarriers. The signals on the respective subcarriers are then individually converted into time domain (OFDM signals) by inverse Fast Fourier Transform (IFFT) processing, guard intervals are added, the signals are upconverted to a high frequency band, and thereafter, are transmitted by corresponding transmit antennas.

Please replace the paragraph at page 2, line 14, through page 3, line 4, with the following rewritten paragraph:

In the communication apparatus at the receiver side, first, high frequency signals received at different reception antennas are individually converted into baseband signals. At this time, since multiple signals (the two channels) are mixed in each baseband signal, these signals must be separated. Each baseband signal is then converted into a frequency domain signal by Fast Fourier Transform (FFT) processing. Namely, the baseband signals become signals of subcarrier units (subcarrier signals). Since signals of plural channels are multiplexed, these subcarrier signals are extracted as reception signals of respective channels by weight control. In ~~Non-Patent Literature 1~~ “Proposal for SDM-COFDM for Wide Band

Mobile Communication Realizing 100 Mbit/s by MIMO Channels”, Technical Report RCS2001-135 of The Institute of Electronics, Information and Communication Engineers,  
Zero-Forcing, which completely suppresses non-desired channels, is used in computing the weight. The reception signals, which are separated into channel units, are respectively subjected to metric computation by demodulation processing, and to error correction processing, and thereafter, are output as final reception signals of respective channels.

Please replace the paragraph at page 3, lines 10-18, with the following rewritten paragraph:

On the other hand, in a communication apparatus that employs the STC method, generally, inverse matrix computation is not needed in channel separation at the reception side, and therefore, reception processing can be realized by a small amount of computation. Further, an apparatus configuration at the reception side can be realized by one antenna, and excellent communication quality can be ensured even in a low S/N environment. Theoretical signal processing of the STC method is disclosed in detail in ~~following Non-Patent Literatures 2 and 3~~ S. M. Alamouti, “A Simple Transmit Diversity Technique for Wireless communications”, IEEE J. Selected Areas in Communications, vol. 16, pp. 1451-1458, Oct. 1998, and V. Tarokh, H. Jafarkhani, A. R. Calderbank, “Space-time Block Coding for Wireless Communications: Performance Results”, IEEE Journal On Selected Areas in Communications, Vol. 17, pp.451-460, No. 3, March 1999.

Please delete the paragraphs starting at page 3, line 19, through page 4, line 7, as follows:

~~Non-Patent Literature 1:~~

~~“Proposal for SDM-COFDM for Wide Band Mobile Communication Realizing 100 Mbit/s by MIMO Channels”, Technical Report RCS2001-135 of The Institute of Electronics, Information and Communication Engineers.~~

~~Non-Patent Literature 2:~~

~~S. M. Alamouti, “A Simple Transmit Diversity Technique for Wireless communications”, IEEE J. Selected Areas in Communications, vol. 16, pp. 1451-1458, Oct. 1998.~~

~~Non-Patent Literature 3:~~

~~V. Tarokh, H. Jafarkhani, A. R. Calderbank, “Space-time Block Coding for Wireless Communications: Performance Results”, IEEE Journal On Selected Areas in Communications, Vol. 17, pp. 451-460, No. 3, March 1999.~~

Please delete the paragraph at page 7, line 4, as follows:

~~First Embodiment~~

Please delete the paragraph at page 14, line 22, as follows:

~~Second Embodiment~~

Please replace the paragraph at page 15, lines 7-25, with the following rewritten paragraph:

The coherent-band width measuring unit 21a periodically observes the baseband signals S11, and computes a coherent band width at the current channel (a frequency width at which the channel gain is considered to be substantially constant). Usually for example, a pilot signal portion is used because a known signal is needed for this computation. Since it is considered to be a substantially constant channel gain within the coherent band width, the

channel estimating unit 15a performs channel estimation processing for one subcarrier within the band width expressed by the coherent band width information S20 (Information expressing the frequency band having substantially the same channel gain at a momentary transmission path. For example, information that the coherent band is 1 megahertz when fluctuations of the channel can be ignored at a width of 1 megahertz within a signal band of 100 megahertz.). Namely, the signal band is divided into several subcarrier groups having the same channel information, by the coherent band information S20. Then, channel estimation processing and equalization matrix generation processing are carried out one time within the group, and the same equalization matrix is used at all of the subcarriers within the group.

Please delete the paragraph at page 16, line 11, as follows:

~~Third Embodiment~~

Please replace the paragraph at page 17, lines 5-24, with the following rewritten paragraph:

Specifically, the beam forming units 9-1 through 9-M carry out individual direction control with respect to each transmission channel, and distribute them into transmission antenna units. The transmission signals S9 after direction control are added in the antenna units by the adding units 10-1 through 10-N, and after IFFT processing is executed by the IFFT units 5-1 through 5-N, the transmission signals S9 are upconverted to a high frequency band and transmitted. Although for convenience of explanation, outputs from some of the beam forming units are not added in Fig. [[8]] 5, in actual practice, the outputs from all the beam forming units are added. It is disclosed in, for example, "Eigenbeam-Space-Division-Multiplexing (E-SDM) Method in MIMO Channels", which is Technical Report RCS2002-

53 of The Institute of Electronics, Information and Communication Engineers, that optimal beam forming refers to a state that “SDM channels that are transmitted simultaneously are channels orthogonal to one another”. The beam forming units control the weights of the respective antennas so as to form orthogonal channels between the transmitter and the receiver. Information of the channel information is needed for the computation of the weights, and this information is informed from the receiver side by a feedback line.